

A NEW BIOCOATING FOR ENHANCED HEAT TRANSFER

Abstract

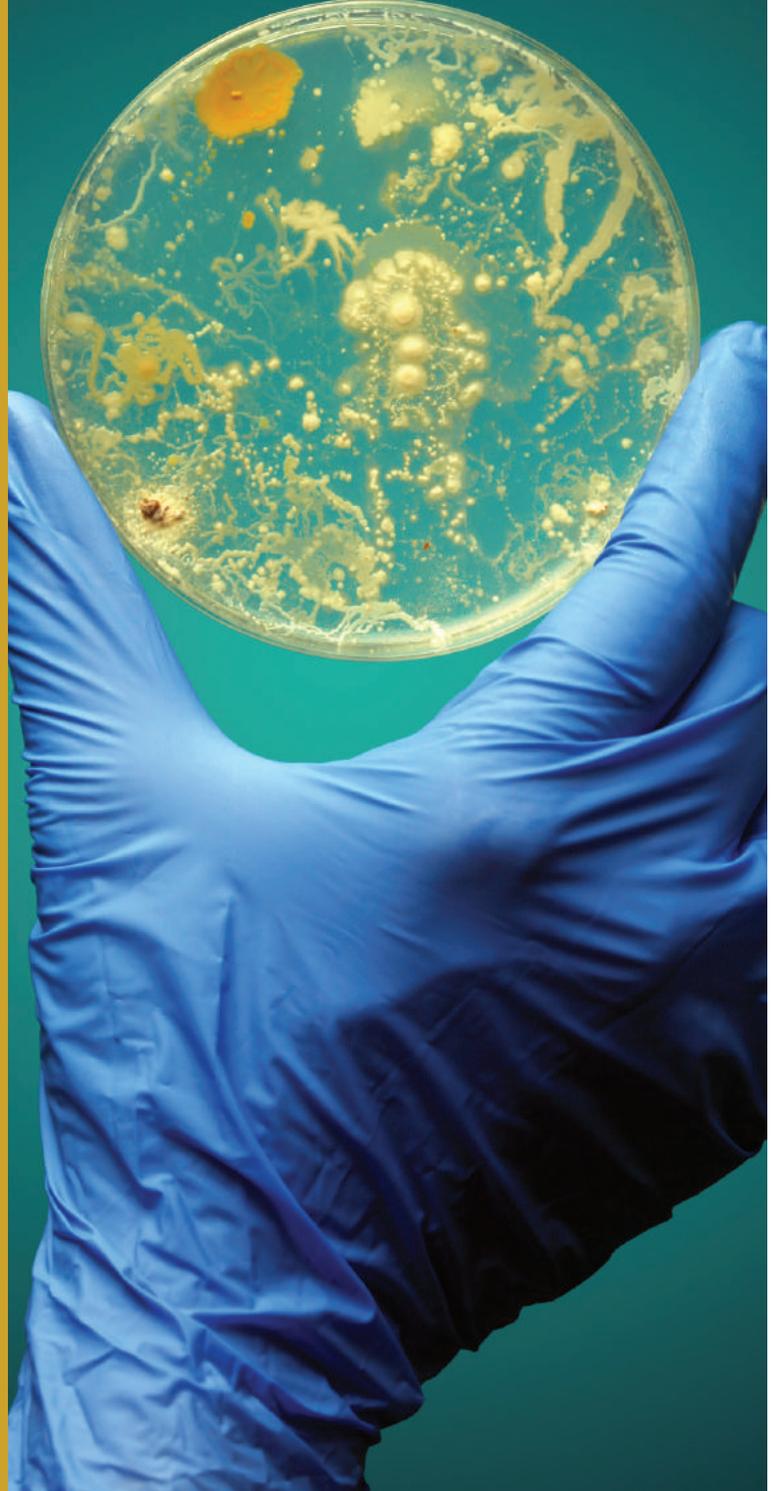
Boiling heat transfer is used in a variety of industrial processes and applications, such as refrigeration, power generation, heat exchangers, cooling of high-power electronics components and cooling of nuclear reactors. Enhancements in boiling heat transfer processes are vital, and could make these typical industrial applications more energy efficient. There is a universal demand for producing more effective heat removal systems involving boiling heat transfer. The current problem is that heat transfer process in electronic devices and other systems is inefficient due to low critical heat flux and low heat-transfer coefficient.

Technology Overview

Coated surfaces offer enhanced boiling heat transfer and have the potential for addressing high heat transfer performance requirements in multiphase heat exchanger applications in the field of refrigeration. In this invention, we propose biocoatings for performance enhancement in boiling. This biocoating is organic, biocompatible and is also applicable to different industrial fields such as refrigeration applications where enhanced performances are sought.

This biocoating as a totally new or combinatory coating solution provides many other solutions against the problems that other conventional coating materials have failed because of their characteristics.

Due to the porous structure of this coating, biocoated surfaces have much more active nucleation sites in comparison to the bare surfaces and have higher performance. This technology has the potential of offering both biocompatibility and enhanced performance. We propose the usage of this coating on multiphase heat exchanger surfaces.



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Technology Features And Specifications

This invention could offer a significant alternative to surface enhancements in microchannels/tubes as well as conventional scale, since the method is easy to implement, efficient, cost friendly, less dependent on surface shape and provides organic. Moreover, this technique could be also used for closed geometries such as microtubes, where physical deposition techniques are not applicable. This invention could be the best candidate to increase the boiling heat transfer coefficient and heat flux.

Potential Applications

This technology has been tested for water, and it can be used to design specific surfaces that are advantageous to other fluids. Listed below are a few target industries that can create technology-gains for the existing products.

This biocoating technology can be utilized in several areas and products such as;

- Electronics Cooling
 - Microprocessors
 - Data Centers
- HVAC and Refrigeration
- Boiler and Heat Exchangers
- Bio-medical Applications
- Defense Application

Customer Benefits

- This coating is applicable to any surface. It can be coated on the surfaces of multiphase heat exchangers being used in refrigeration and other fields.
- No required investment for the implementation of the coating. Standard exchangers and evaporators in refrigeration systems could be easily coated.
- Invention complies with the standards in refrigeration systems.
- Resistant to harsh conditions. These biocoating can stay alive under physiologically harsh conditions such as low or high temperatures, high salinity and low or high pH.
- The thickness of the biocoating can be controlled with the concentration, that's why it can be coated in desired thickness.
- It can be applied to closed geometries.
- It is possible that the bacterial can leave the surface by changing the conditions of the environment.
- Easy to integrate into the system.
- Easy to clean.